

Power point Example

NEUROHEADWAY

Neuroscience Into Education

How animals think?

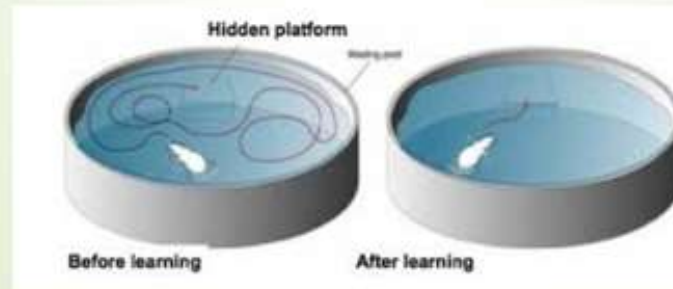
- Can animals really think?
- What are they thinking of?
- Do they have memories?
 - Or feel emotions?
- Can they be learned? How?
- Can previous experiences influence their future behavior?
- Can we learn something from them?

How animals think?

- Animal mental processes inspired scientists over centuries creating experiments to reject or prove the theories about animal mental life
- They were trying to measure animal mental processes like thinking, learning, cognition, emotional responses...
- Since animals process information almost from the same sensory apparatuses like humans (eyes, ears, ...) perceptual processes are often similar to those found in humans
- Many of them feel the same sort of sensations, emotions as humans do – they feel cold, pain, fear, anxiety but also happiness, joy – but they do not always react the way we can understand it easily
- Therefore a special behavioral tests were developed to understand and measure specific types of animal mental processes

Studying memory in animals using mazes

- Memory in animals is tested using very popular and demonstrative experimental tools – mazes
- Example – **water maze** – an animal has to remember position of a hidden platform (submerged in opaque water)

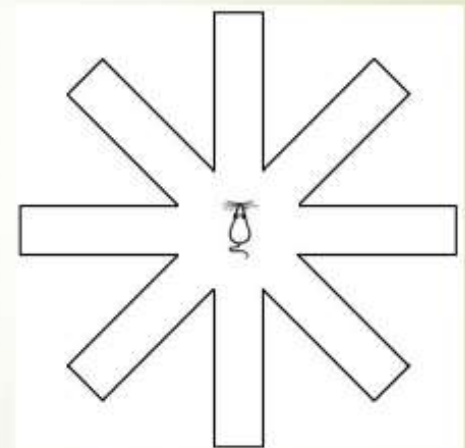


First trials are training trials – an animal has to find (usually by accident) and remember a position of a hidden platform.

once learned, it immediately swims onto the platform. Better learners have shorter swim path or escape latency time to find a hidden platform).

Studying memory in animals using mazes

- Radial arm maze** - very popular maze to test learning and memory in experimental animals – rats
- Principle of the test is very simple - at the end of each arm – there is a cup filled with a food pellets
- Animal is put into the maze and has to visit each arm only once – to eat the reward, if it visits the same arm twice – It is considered as working memory error



How animals think – A Tool use

- Although tool use was long assumed to be uniquely a human trait, there is evidence that many animals including – mammals, birds, fish, cephalopods or insects are using tools when displaying specific behavior such as :
 - Hunting, collecting food or building nests

Example: Chimpanzees are famous

- for their termite fishing with twigs
- for making rain hats (umbrellas) or sponges from leaves
- for making straws from long grass to reach water from hollow trees
- for cracking nut shells by handmade hammer and anvil tool
- for making long spear-like tools to catch small nocturnal primates (which are sleeping inside deep tree holes)

Termite fishing - chimpanzees

- Chimpanzees use for fishing two types of tool (both sharpened by teeth)
- First is a heavy stick to chisel a hole into the termite mound (and to find an opening)
- The second is a fishing tool – thin long blade of grass with which easily fits into the hole and termites climb onto
- Then the fishing tool is simply pulled out and termites are eaten
- Such learned behavior provides a healthy rich protein diet



Jane Goodall talks about termite fishing at
<https://www.youtube.com/watch?v=InFkERO30oM>

A tool use Shell-stealing octopus

- Cephalopods are famous for their cleverness, they are smart, able to solve mazes, to remember visuospatial cues..
- However, lately scientists discovered that some of them are using tools – a behavior that was strictly associated to vertebrates
- A veined octopus was found to carry two halves of coconut shell under their bodies – and when necessary – assembled them as shelters



A video of veined octopus carrying a coconut shell see at
<https://www.youtube.com/watch?v=BFda1MZ54G4&spfreload=10>